FLOOD INSURANCE STUDY

AVERY COUNTY, NORTH CAROLINA

UNINCORPORATED AREAS

REVISED:

SEPTEMBER 28, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER 370010

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

AVERY COUNTY,
UNINCORPORATED AREAS,
NORTH CAROLINA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Avery County, North Carolina, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the Tennessee Valley Authority (TVA) (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-87-E-2513, Project Order No. 1. This study was completed in June 1988.

1.3 Coordination

In September 1986, an initial coordination meeting was held with representatives of FEMA and the Study Contractor.

On November 8, 1989, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Avery County, North Carolina. The area of study is shown on the Vicinity Map (Figure 1). The incorporated areas within the county were excluded from this study.

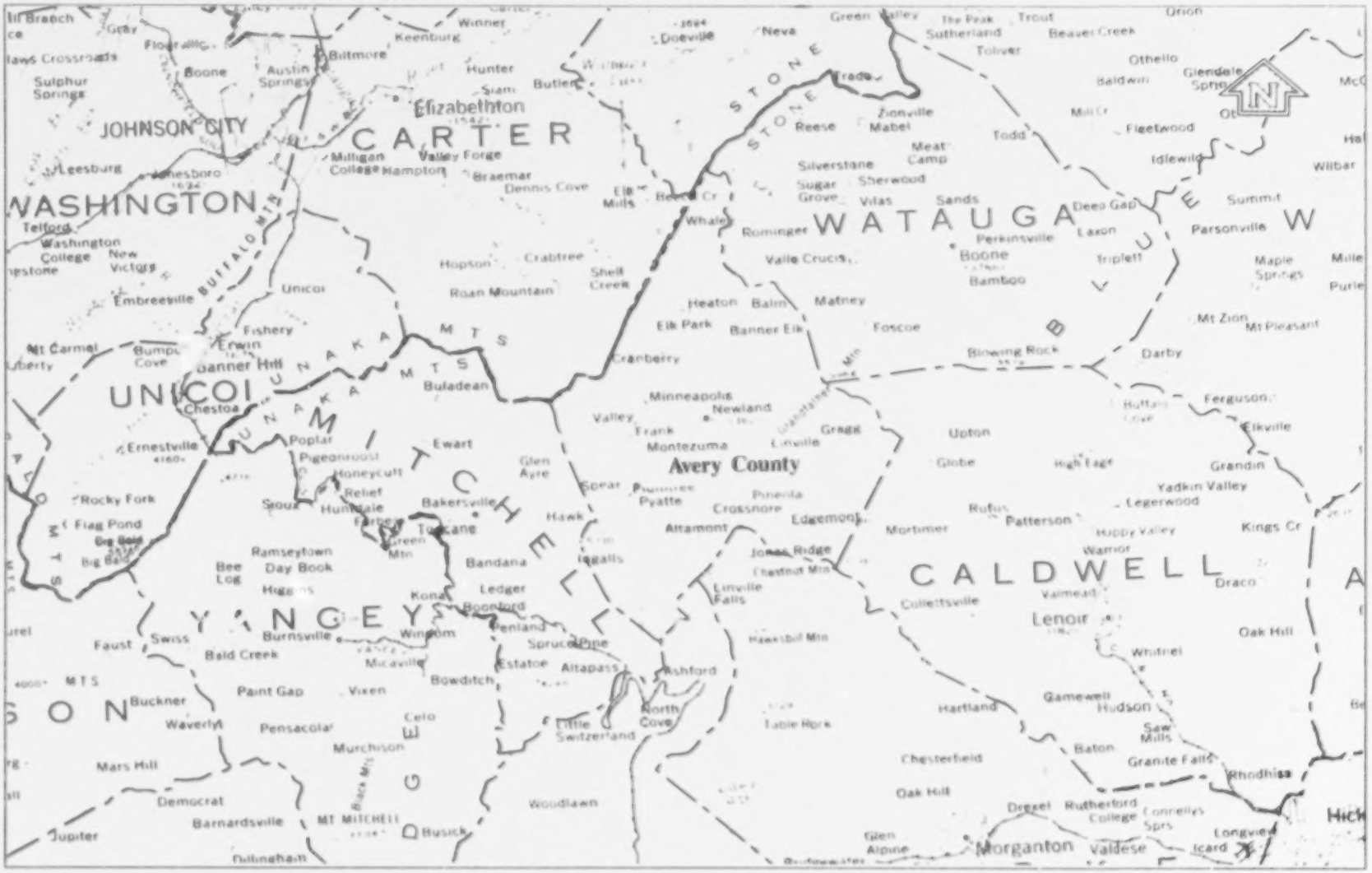


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY COUNTY, NC
(UNINCORPORATED AREAS)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

Flooding caused by overflow of the Linville River, the Elk River and West Fork was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for Avery County, North Carolina (Reference 1) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through June 1993. The scope and methods of study were proposed to and agreed upon by FEMA and Avery County.

2.2 Community Description

Avery County is in northwestern North Carolina, and is bordered on the north by Johnson and Carter Counties, Tennessee and Watauga County, North Carolina; on the west by Mitchell County, North Carolina; on the south by McDowell and Burke Counties, North Carolina; and on the east by Caldwell County, North Carolina. Avery county is served by U.S. Routes 221, 321 and 19E and State Roads 194, 184, and 181. The 1980 population was reported to be 14,409 (Reference 2).

Avery County has a cool climate with moderate summers. The highest monthly average summer temperature is 66 degrees Fahrenheit (°F); the lowest monthly average winter temperature is 31°F. The average annual precipitation of 50 inches is reasonably well distributed throughout the year but noticeably less in the late summer and early fall (Reference 3).

2.3 Principal Flood Problems

The August 1940 flood, the result of a tropical storm that moved inland, is considered the largest flood known to have occurred in Avery County. Information about past flooding on the Linville River consists of one floodmark for the August 1940 flood and a series of floodmarks for a small flood of approximately bankfull stage and unknown date. The August 1940 flood reached elevation 3,638.8 National Geodetic Vertical Datum of 1929 (NGVD) downstream of U.S. Route 221 and had a recurrence interval slightly greater than 500 years (Reference 4). Available records indicate that a church building was washed away, a service station flooded in the Town of Linville, and the Land Harbors Dam was washed out (Reference 5).

As a result of the August 1940 flood on the Elk River, State Road 184 near the present Holiday Inn was inundated by 6 to 12 inches of water. The highway has since been raised approximately 12 to 18 inches.

2.4 Flood Protection Measures

Nonstructural measures of flood protection in the form of land-use regulations are being used to aid in the prevention of future flood damage (Reference 6).

The Land Harbors Dam on the Linville River provides the community with some degree of flood protection, but may not protect the community from rare events such as the 100-year flood.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40-percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60-percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

Because of the absence of stream gage records in or near the Linville River, the Elk River, and West Fork, regional relationships were used to estimate peak discharge frequency. These relationships were determined using stream gage records from watersheds with hydrometeorological characteristics similar to the study streams. Flood-frequency curves for these streams were computed using the procedure outlined in Bulletin No. 17A (Reference 7) including adjustments for historic flood information where available. The results of these analyses were combined to develop the regional relationships applicable to Avery County.

Flow estimates based on the adopted regional relationships were compared to estimates based on U.S. Geological Survey (USGS) relationships developed for the region (Reference 8). For the range of drainage areas covering the study streams, discharges from the USGS-developed relationships for North Carolina are from 26-percent lower to 3-percent higher than the adopted regional relationships.

The differences between the adopted regional relationships and those of the USGS result mainly from the different gaged watersheds used in each analysis. The adopted relationships were determined from gaged watersheds in the Avery County region with areas of about 800 square miles or less while the USGS relationships are based on gaged watersheds up to

8,400 square miles in size throughout the Blue Ridge and Piedmont Provinces of North Carolina.

Peak discharge-drainage area relationships for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
LINVILLE RIVER					
at Land Harbors Dam	19.2	2,800	4,970	6,160	9,710
just upstream of confluence of Grandmother Creek	11.3	1,920	3,380	4,170	6,510
just upstream of confluence of West Fork	6.39	1,280	2,230	2,740	4,230
ELK RIVER					
just upstream of confluence of Sugar Creek	2.52	660	1,130	1,380	2,100
WEST FORK					
at mouth	3.52	840	1,440	1,770	2,700
about 480 feet upstream of SR 1351	3.19	780	1,340	1,640	2,570

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections were taken from field surveys. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Water-surface elevations of floods of the selected recurrence intervals were computed using the HEC-2 step-backwater computer program (Reference 9). The Linville River backwater computations were started at critical depth and West Fork computations were started from the Linville River elevations.

Roughness coefficients (Manning's "n") used in the hydraulic computations were determined on the basis of field inspections of the channels and

floodplain areas. For the Linville River, roughness values ranged from 0.035 to 0.065 in the channel and from 0.07 to 0.15 in the overbank areas. The roughness values for West Fork ranged from 0.05 to 0.06 in the channel and from 0.08 to 0.13 in the overbank.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been shown.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to NGVD. Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps enlarged to a scale of 1:4800 with a contour interval of 40 feet (Reference 10).

The 100-year and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using Flood Hazard Boundary Map for Avery County (Reference 1).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways for this study were designed for optimum benefit to the community. Floodway analyses were based on equal conveyance reduction and adjusted as necessary to account for the effects of existing development and to provide functional and manageable floodways. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than 1.0-foot increase in the base flood elevations at any point within the community.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
LINVILLE RIVER								
A	5	505	6733	0.9	3539.6	3539.6	3539.6	0.0
B	1675	510	7008	0.8	3539.6	3539.6	3539.6	0.0
C	3290	75	886	6.5	3541.3	3541.3	3541.3	0.0
D	5000	70	776	7.3	3549.6	3549.6	3550.2	0.6
E	6070	100	1049	5.4	3552.9	3552.9	3553.3	0.4
F	8121	135	1183	4.7	3561.7	3561.7	3562.4	0.7
G	11,092	160	1378	4.0	3568.4	3568.4	3569.1	0.7
H	13,822	310	2027	2.7	3573.7	3573.7	3574.6	0.9
I	15,462	190	1519	3.5	3576.5	3576.5	3577.4	0.9
J	17,582	85	712	5.8	3581.7	3581.7	3582.4	0.7
K	19,802	110	916	4.4	3592.0	3592.0	3592.5	0.5
L	21,772	295	1113	3.6	3603.2	3603.2	3604.0	0.8
M	23,509	150	783	5.1	3612.0	3612.0	3612.9	0.9
N	24,269	45	402	9.6	3617.0	3617.0	3617.8	0.8
O	25,659	70	633	6.0	3633.0	3633.0	3633.7	0.7
P	27,554	120	405	6.7	3641.9	3641.9	3642.0	0.1
Q	29,599	65	343	7.5	3655.1	3655.1	3655.8	0.7
R	29,999	145	549	4.7	3659.6	3659.6	3660.2	0.6
S	31,919	70	408	6.0	3675.6	3675.6	3675.9	0.3
T	33,529	70	536	4.4	3687.5	3687.5	3688.3	0.8
U	34,419	80	418	5.3	3695.6	3695.6	3696.5	0.9

[1]FEET ABOVE LAND HARBORS DAM

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY CO., NC
(UNINCORPORATED AREAS)

FLOODWAY DATA

LINVILLE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
ELK RIVER								
A	144,294	35	162	8.5	3704.0	3704.0	3704.0	0.0
B	144,766	35	142	9.8	3711.5	3711.5	3712.2	0.7
C	145,244	60	208	6.6	3722.0	3722.0	3722.8	0.8
D	146,458	40	326	4.2	3757.5	3757.5	3758.3	0.8
E	147,567	30	122	11.3	3778.9	3378.9	3378.9	0.0
WEST FORK								
A	870	30	160	11.1	3648.1	3648.1	3648.9	0.8
B	1535	40	232	7.6	3660.2	3660.2	3661.0	0.8
C	2845	85	220	7.9	3684.2	3684.2	3684.4	0.2

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY CO., NC
(UNINCORPORATED AREAS)

FLOODWAY DATA

ELK RIVER—WEST FORK

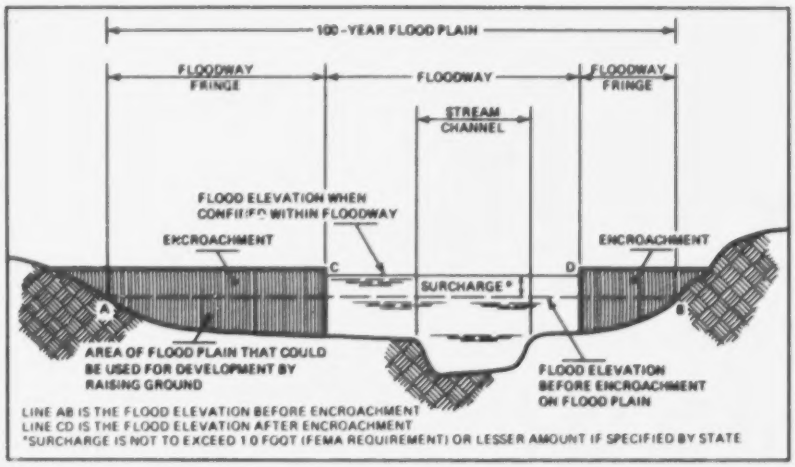

100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The Flood Insurance Studies published for Carter County, Tennessee; Watauga, Caldwell, Mitchell, and McDowell Counties, North Carolina; Town of Banner Elk, North Carolina; and the Town of Newland, North Carolina; (References 11-17) are in agreement with this study.

The Flood Insurance Rate Maps printed for Johnson County, Tennessee; Town of Crossnore, North Carolina; and the Town of Elk Park, North Carolina (References 18, 19, 20) are in agreement with this study.

The Flood Insurance Study in progress for Burke County, North Carolina (Reference 21) is in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for Avery County, North Carolina (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Avery County, Unincorporated Areas, North Carolina, June 1978.

2. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, North Carolina, Washington, D.C., February 1982.

3. ————, National Oceanic and Atmospheric Administration, Climatological Data for Tennessee, Annual Summary, Asheville, North Carolina, National Climatic Center, 1956-1976.

4. Tennessee Valley Authority, Data Services Branch files, Tennessee Valley Authority, Knoxville, Tennessee, unpublished data.

5. ————, Flood Protection Branch, Division of Air and Water Resources, open files.

6. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Code of Federal Regulations, Title 24, Chapter 10, Parts 1910.3A and 3B, Federal Register, Vol. 41, No. 207, revised 1976.

7. U.S. Water Resources Council, Bulletin No. 17A, Guidelines for Determining Flood Flow Frequency, June 1977.

8. U.S. Geological Survey, Magnitude and Frequency of Floods in Rural and Urban Basins of North Carolina, 1987.

9. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Computer Program HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A, Davis, California, April 1984.

10. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 40 feet: Newland, North Carolina, 1960, photorevised 1978; Grandfather Mountain, North Carolina, 1960, photorevised 1978; Elk Park, North Carolina, 1960.

11. Federal Emergency Management Agency, Flood Insurance Study, Carter County, Tennessee, January 1990.

12. ----------, Federal Insurance Administration, Flood Insurance Study, Watauga County, Unincorporated Areas, North Carolina, June 1980.

13. ————, Flood Insurance Study, Caldwell County and Incorporated Areas, North Carolina, August 1988.

14. ————, Flood Insurance Study, Mitchell County and Incorporated Areas, North Carolina, September 1988.

15. ————, Flood Insurance Study, McDowell County and Incorporated Areas, North Carolina, July 1988.

16. ————, Flood Insurance Study, Town of Banner Elk, North Carolina, January 1988.

17. ————, Flood Insurance Study, Town of Newland, North Carolina, June 1984.

18. ————, Flood Insurance Rate Map, Johnson County, Unincorporated Areas, Tennessee, July 1986.

19. ————, Flood Insurance Rate Map, Town of Crossnore, North Carolina, August 1986.

20. _____, Flood Insurance Rate Map, Town of Elk Park, North Carolina, April 1986.

21. ----------, Flood Insurance Study, Burke County, North Carolina, in progress.

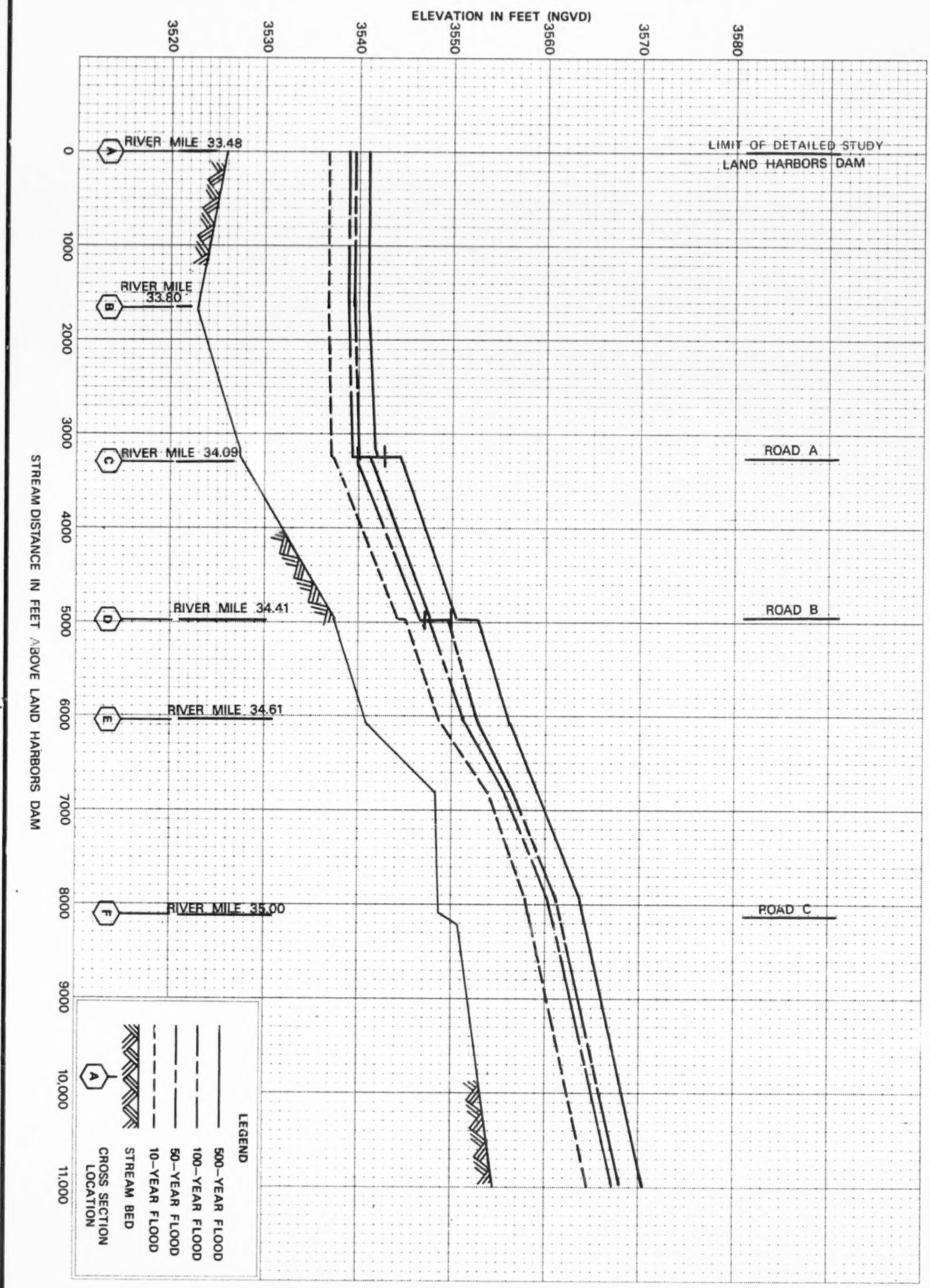
ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0050	3,531.8	chiseled square on east side of Land Harbors Dam spillway, 42 feet from spillway wall of dam
2	0050	3,542.6	chiseled square on upstream northwest wingwall of Road A bridge over the Linville River, about 3,250 feet upstream of Land Harbors Dam
3	0050	3,550.3	chiseled square on downstream south wingwall of Road B bridge over the Linville River, about 0.9 mile upstream of Land Harbors Dam
4	0050	3,552.4	chiseled square in floor at center of low water Road C bridge over the Linville River, about 1.5 miles upstream of Land Harbors Dam
5	0050	3,569.6	top of square bolthead placed vertically in upstream west bank end of curb of Road D bridge over the Linville River, about 2.9 miles upstream of Land Harbors Dam
6	0075	3,649.2	top of 0.5-inch steel rebar mounted vertically in concrete base of Oberlin sign located on north side of State Road 181, about 700 feet east of intersection of Linville Bypass and State Road 181
*7	0075	3,645.4	chiseled square on downstream west wingwall of State Road 181 bridge over the Linville River
*8	0075	3,646.5	chiseled square on downstream west headwall of State Road 105 bridge over the Linville River
9	0075	3,659.4	top of bolthead on downstream west end of wood curb of Road E bridge over the Linville River, about 400 feet east of State Road 105

*Located within area not included

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
10	0075	3,677	chiseled square on base of light pole located on east bank of the Elk River just downstream of SR 1341 bridge over the Elk River



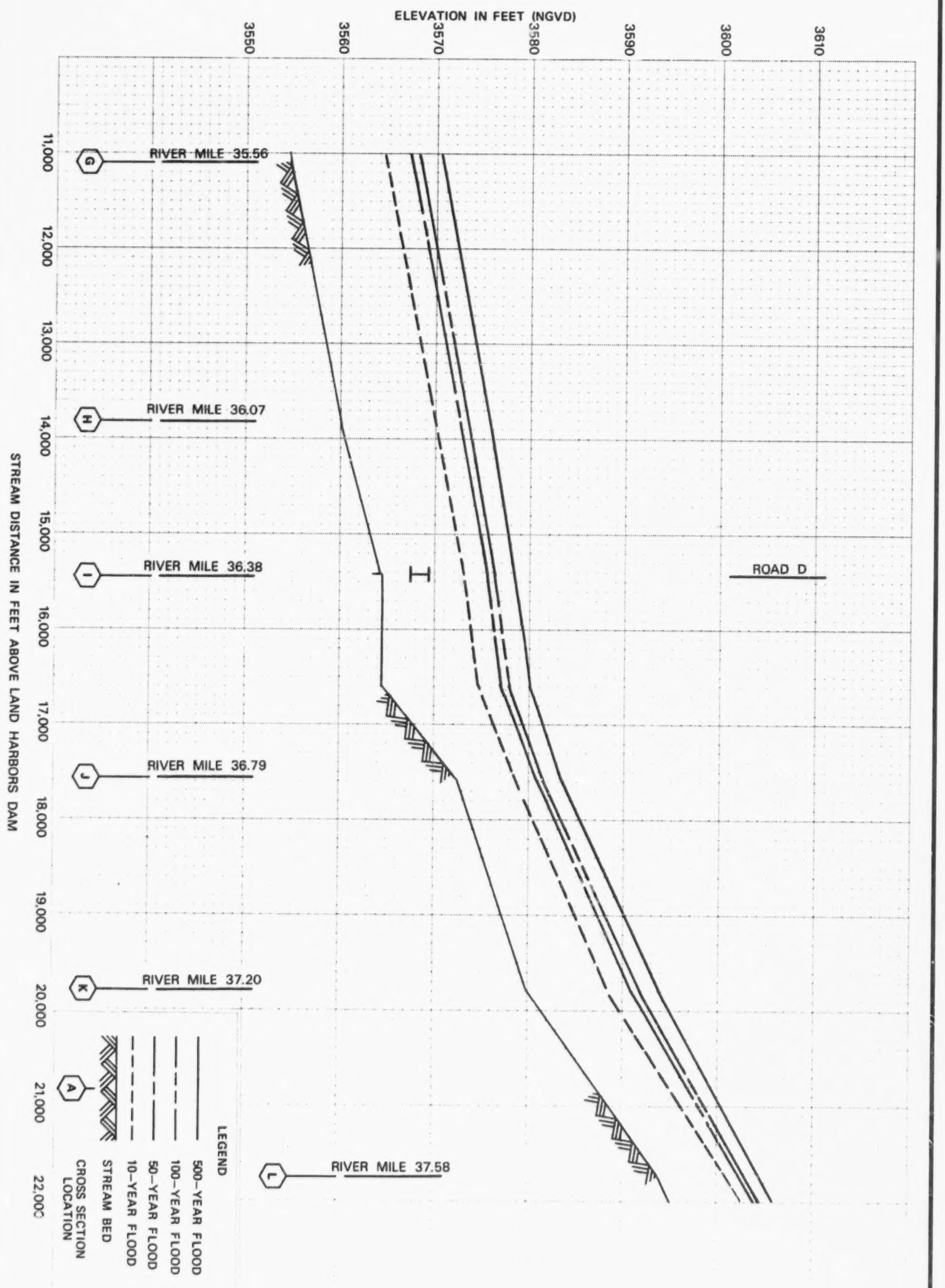
FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY COUNTY, NC
(UNINCORPORATED AREAS)

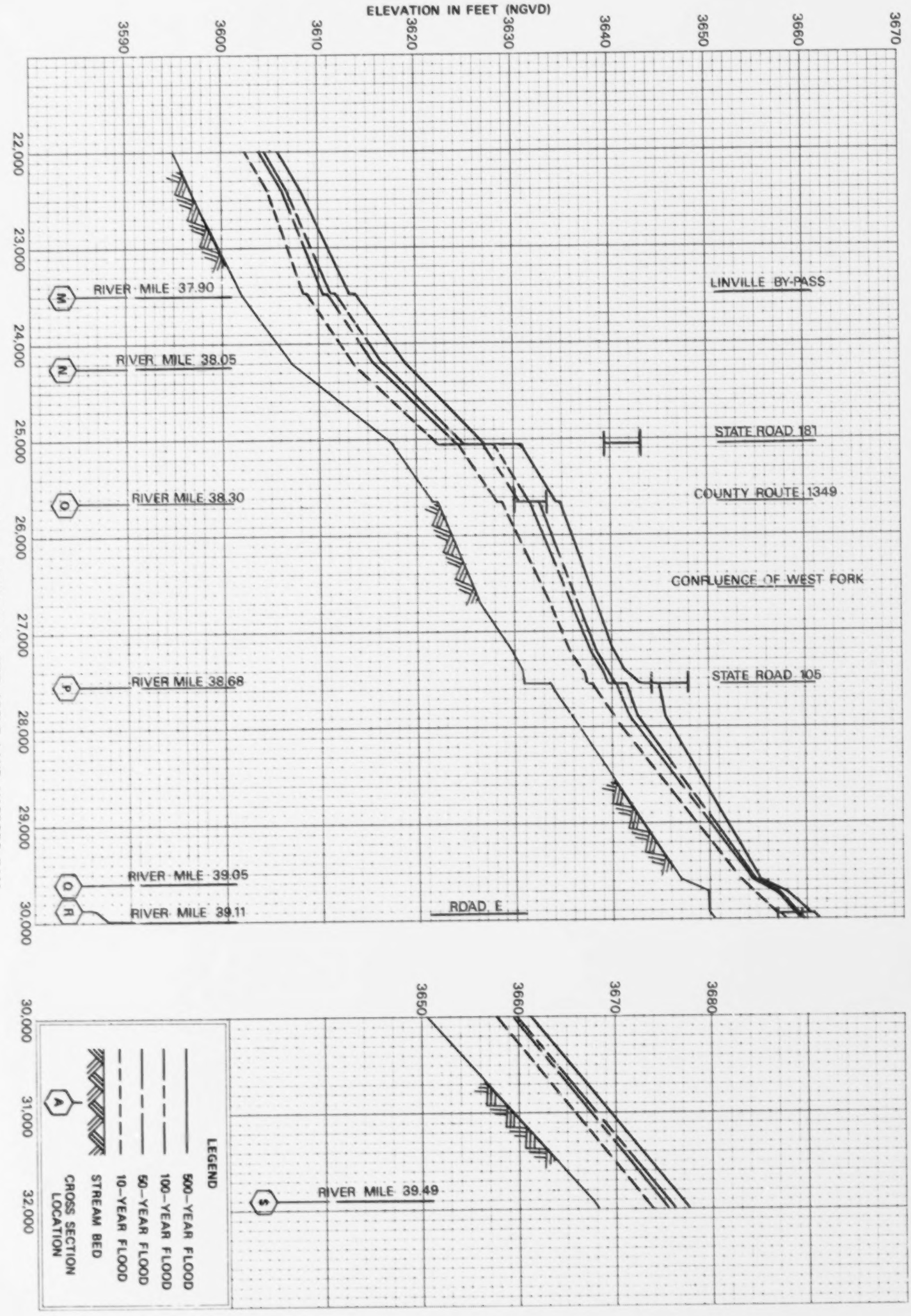
FLOOD PROFILES

LINVILLE RIVER

01P



02P	FEDERAL EMERGENCY MANAGEMENT AGENCY **AVERY COUNTY, NC** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **LINVILLE RIVER**



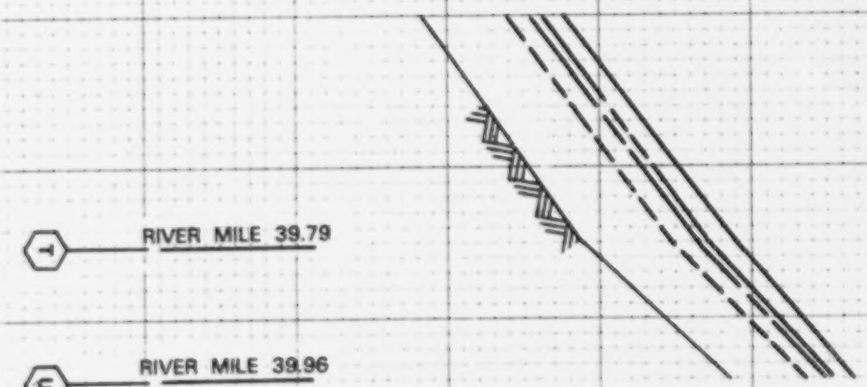
03P	FEDERAL EMERGENCY MANAGEMENT AGENCY **AVERY COUNTY, NC** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **LINVILLE RIVER**

ELEVATION IN FEET (NGVD)

3660 3670 3680 3690 3700

32,000 33,000 34,000 35,000

STREAM DISTANCE IN FEET ABOVE LAND HARBORS DAM



(T) RIVER MILE 39.79

(C) RIVER MILE 39.96

LIMIT OF DETAILED STUDY

LEGEND

500-YEAR FLOOD

100-YEAR FLOOD

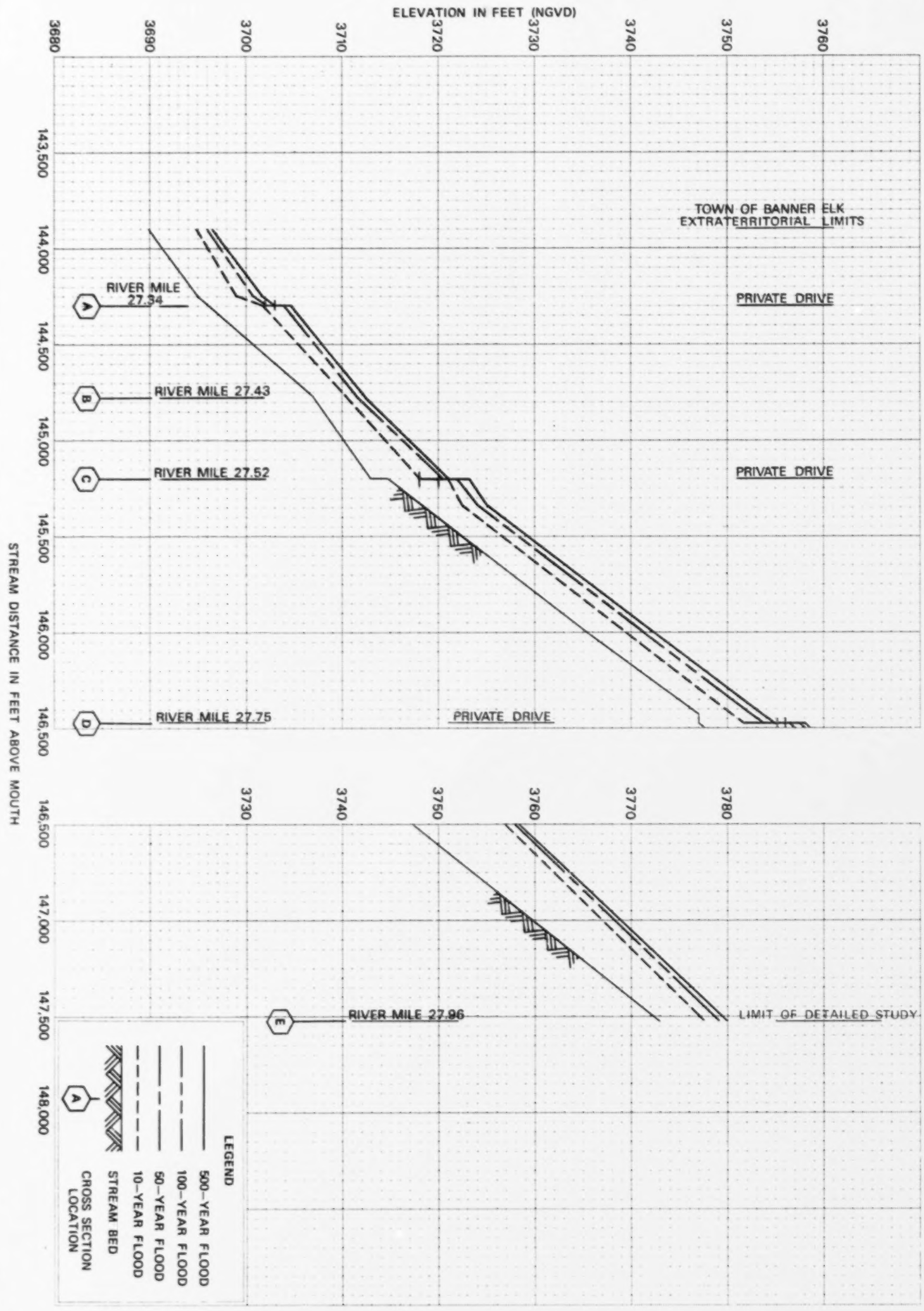
50-YEAR FLOOD

10-YEAR FLOOD

STREAM BED

(A) CROSS SECTION LOCATION

04P	FEDERAL EMERGENCY MANAGEMENT AGENCY **AVERY COUNTY, NC** **(UNINCORPORATED AREAS)**	**FLOOD PROFILES** **LINVILLE RIVER**



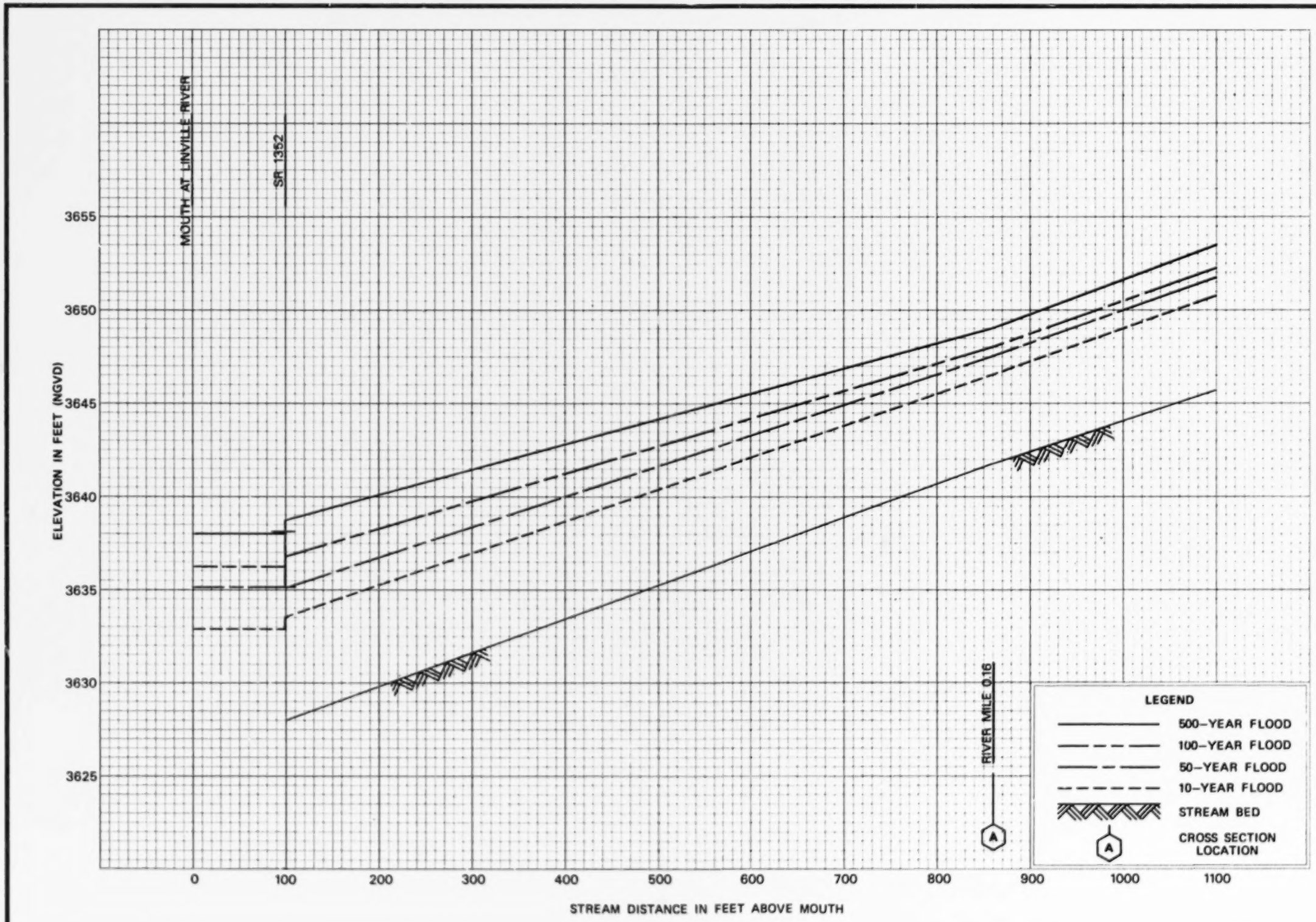
05P

FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY COUNTY, NC
(UNINCORPORATED AREAS)

FLOOD PROFILES

ELK RIVER



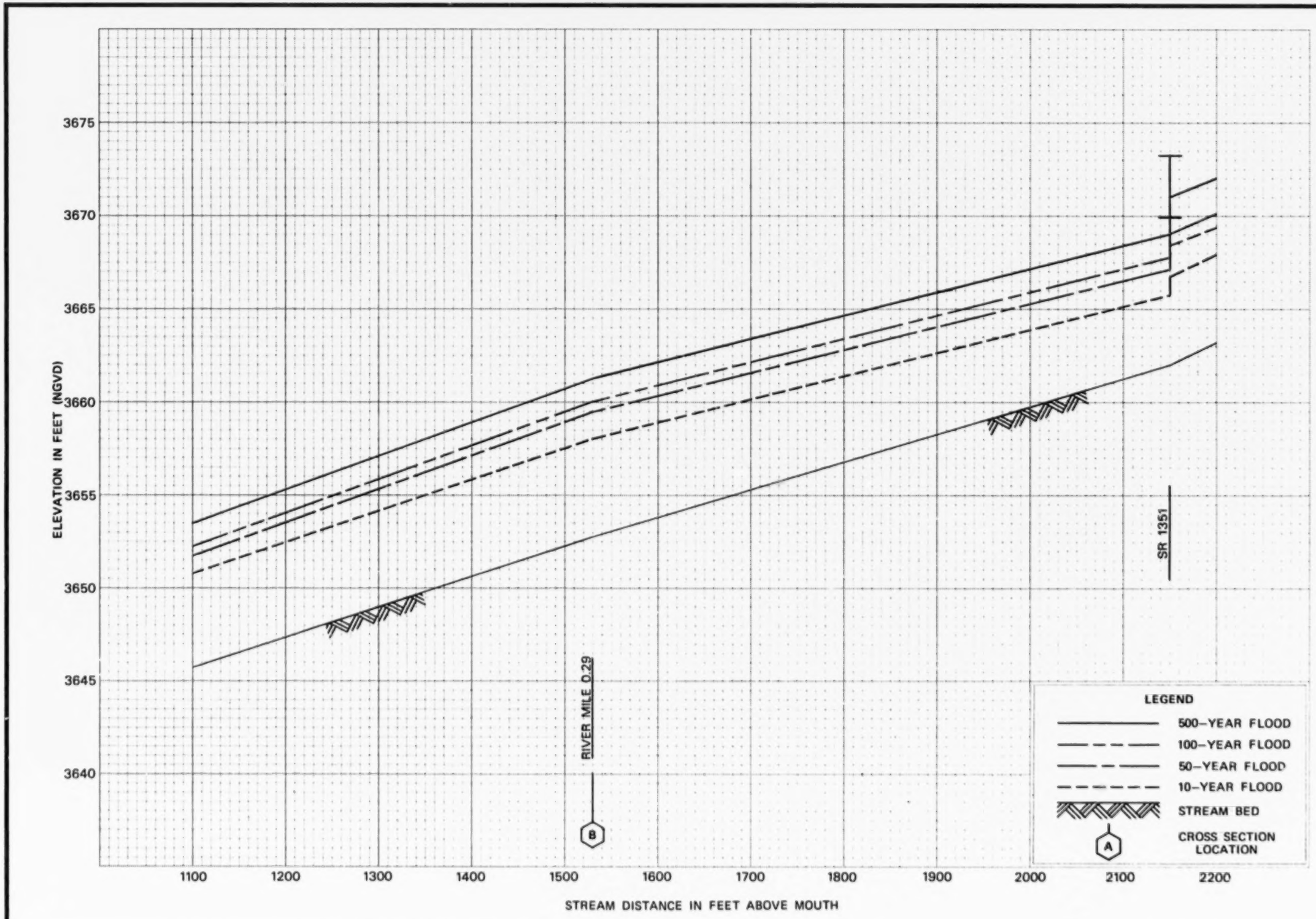
FLOOD PROFILES

WEST FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY COUNTY, NC
(UNINCORPORATED AREAS)

06P



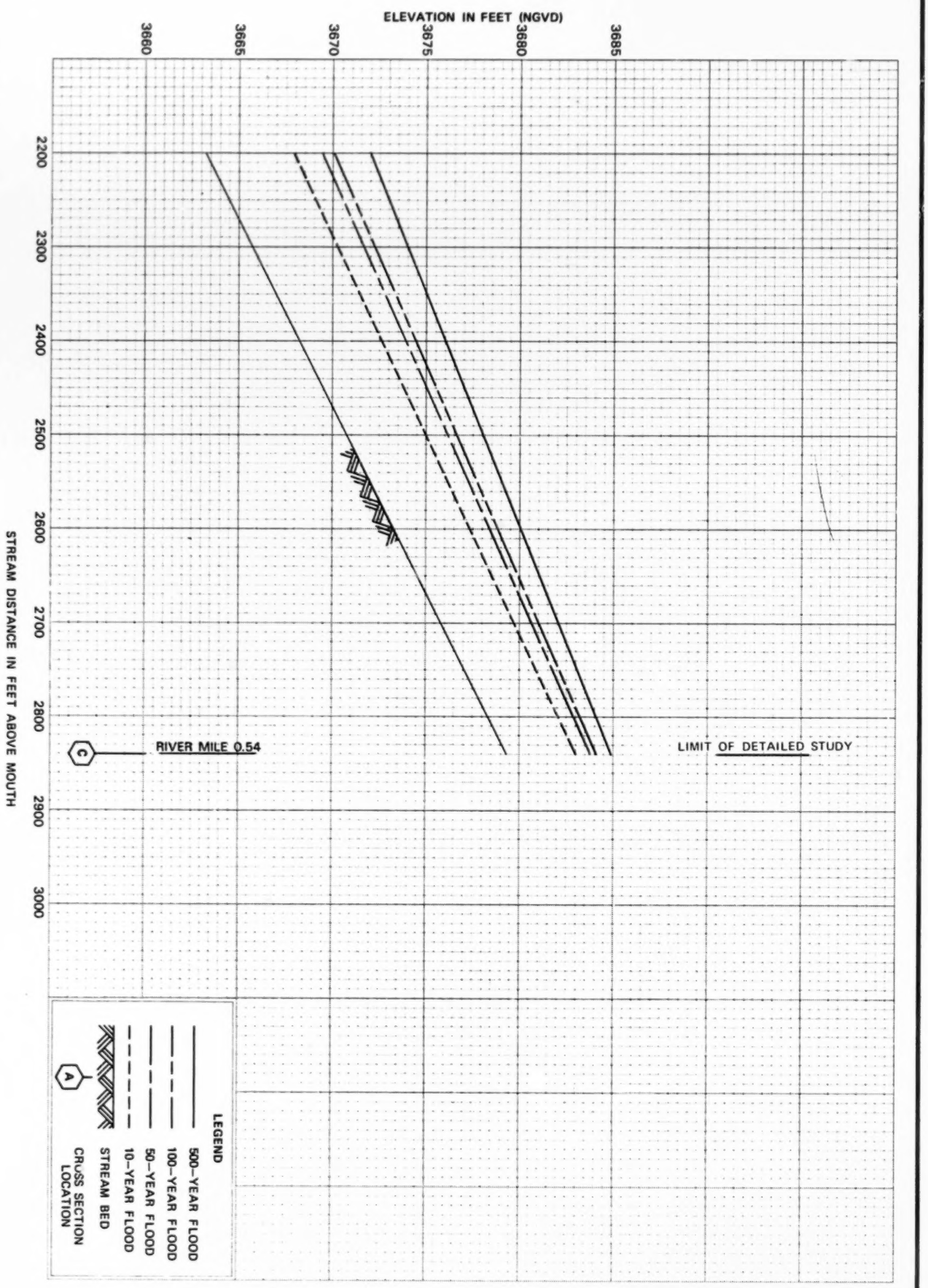
FLOOD PROFILES

WEST FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY COUNTY, NC
(UNINCORPORATED AREAS)

07P



23

08P

FEDERAL EMERGENCY MANAGEMENT AGENCY

AVERY COUNTY, NC
(UNINCORPORATED AREAS)

FLOOD PROFILES

WEST FORK